

REMARKS

Applicants respectfully request reconsideration and allowance of the pending claims.

I. Status of the Claims

Upon entry of this amendment, claims 30-34, 36-38, 40-51, and 53-62 remain pending, while claims 63-74 have been added.

New claim 63 is supported by claim 30 and paragraphs [0029] through [0033]. New claim 68 is supported by claim 40 and paragraphs [0029] through [0033]. New claims 73 and 74 are supported by claim 53 and paragraphs [0029] through [0037].

New claims 64 and 69 are supported by Example 1.

New claims 65 and 70 are supported by Example 2a.

New claims 66 and 71 are supported by Examples 2b and 3.

New claims 67 and 72 are supported by Examples 5, 6, and 7.

II. Double Patenting

The pending claims are provisionally rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1-27 of co-pending application Ser. No. 11/105,947. Unless and until the co-pending application matures into a patent, however, the appropriateness of such a rejection cannot be ascertained. Applicant will consider filing a terminal disclaimer to obviate this rejection when the application is otherwise in condition for allowance.

III. Claim Rejections Under 35 U.S.C. §103(a)

A. Method Claims 30-34, 36-38, and 56-60

Reconsideration is requested of the rejection of the method claims 30-34, 36-38, and 56-60 as being obvious over Dietterle

et al. (WO02/24979 and U.S. 7,179,362) in view of Tsuji et al. (U.S. 6,607,653).

1. The Invention as Defined by Claim 30

Claim 30 is directed to a method for electrolytic deposition of bronze onto a substrate. The method comprises immersing the substrate in an aqueous acidic electrolyte having a pH less than about 1. The electrolyte comprises:

- a) tin ions;
 - b) copper ions;
 - c) an alkylsulfonic acid;
 - d) a wetting agent consisting of an aromatic, nonionic wetting agent; and
 - e) an oxidation inhibitor;
- wherein a ratio of tin ion concentration to copper ion concentration is sufficient to electrolytically deposit a bronze having a copper content of greater than about 60%; ...

Claim 30 is therefore directed to a method for electrolytically depositing a bronze alloy, i.e., a copper-tin alloy having a copper content greater than 60%.

2. Disclosures of the Prior Art

The Dietterle et al. and Tsuji et al. references are directed to methods of depositing tin-rich, low-copper alloys for soldering. Dietterle et al. disclose at paragraph [0061]:

[0061] The tin-copper alloys applied using this method can contain copper in an amount of 0.1 to 99.9 wt-%. **To allow the alloys to be soldered at low temperatures, they preferably comprise a copper content of 0.5 to 10 wt-%, particularly preferred 2 to 5 wt-%.** The copper content can be adjusted, for example, by varying the concentration ratios of the tin and copper salts in the electrolyte, the temperature of the electrolyte and the flow rate of the electrolyte based on the material to be coated.

Despite the broad defensive reference to 0.1 to 99.9% Cu, one skilled in the art viewing the reference as a whole would immediately understand that it relates to tin-rich solder alloys for use in electronics:

[0002] When manufacturing electronic components, soft **soldering**

[0003] Even though the cited lead-tin alloys show very good properties when soft-**soldering**

[0004] A promising alternative to the eutectic lead-tin **solder**

[0005] If the tin-silver-copper **solder** is used

[0006] A further promising alternative to the eutectic lead-tin **solder** is the tin-copper alloy....

This person would have complete grasp of the common knowledge in the field that such a solder must have high tin and low copper so that it has a lower melting point, so it can be melted without destroying the electronic device substrate. This immediate understanding is reinforced by Dietterle et al.'s statement that "To allow the alloys to be soldered at low temperatures, they preferably comprise a copper content of 0.5 to 10 wt%, particularly preferred 2 to 5 wt-%."

If this person had any knowledge of patents, he or she would also immediately understand that the reference to "0.1% to 99.9% Cu" is a gratuitous defensive statement inserted by the patent attorney to provide "written description" support for an interpretation of the claims as not limited to a particular copper content. And even without knowledge of patents, one skilled in the art would not read the disclosure as teaching the formulation of alloys with any and all possible copper contents whatsoever, i.e., 0.1 to 99.9% copper, because an alloy with,

e.g., 70% copper behaves so fundamentally distinct from an alloy with, e.g., 10% copper.

Similarly, Tsuji et al. also disclose a preference for low copper amounts at Col. 8, lines 56-60:

The ratio of the metal compounds in the tin-copper alloy plating bath, tin-copper-silver alloy plating bath and tin-copper-bismuth alloy plating bath can be suitably selected depending on the desired composition of the plated alloy coating. For example, in order to obtain a deposit of a **tin-rich plated alloy coating** containing tin and copper, which can be a substitute for a solder coating in which the weight ratio of tin to lead is 9:1, **the molar ratio of the tin compound and other metal compounds in the plating bath may be about 99:1 to about 85:15.**

Moreover, the highest concentration of copper ion in the Examples of Tsuji et al. is only 0.44 g/L, used in Examples 14A, 8B, and 8C. In every other example, the copper concentration is less than these maxima, sometimes significantly less. Note further that the tin concentrations are substantially higher than the copper concentrations, which invariably results, as further shown in the Examples, in tin-rich alloys.

3. The Office's Proposed *Prima Facie* Case of Obviousness

The Office asserts that the combination of Dietterle et al. and Tsuji et al. are sufficient to establish a *prima facie* case of obviousness with regard to claim 30, relying on Dietterle et al.'s paragraph [0061] for the assertion that their disclosure of a broad copper range from 0.1 to 99.9 wt-% renders claim 30's required copper content of greater than 60% obvious:

[0061] The tin-copper alloys applied using this method can contain copper in an amount of 0.1 to 99.9 wt-%. To allow the alloys to be soldered at low temperatures, they preferably comprise a copper content of 0.5 to 10 wt-%,

particularly preferred 2 to 5 wt-%. The copper content can be adjusted, for example, by varying the concentration ratios of the tin and copper salts in the electrolyte, the temperature of the electrolyte and the flow rate of the electrolyte based on the material to be coated.

The Office makes this assertion despite the lack of any disclosure in either reference of a method or example showing the deposition of a copper-rich bronze from a composition further comprising the required electrolyte components. The Office cites MPEP 2141.03 (Level of Skill in the Art) and 2144.05 Part II.B in support of the assertion that Dietterle et al.'s broad defensive disclosure is sufficient to render claim 30's method of depositing a copper rich bronze obvious.

4. Deficiencies in the Office's *Prima Facie* Case of Obviousness

Applicants respectfully submit that the Office's *prima facie* case of obviousness is legally deficient under the obviousness standards outlined in the MPEP and the recently issued opinion by the Supreme Court in *KSR Int'l Co. v. Teleflex Inc.* Moreover, assuming for the sake of argument that the Office's *prima facie* case were not deficient, there is sufficient material teaching away in both references to effectively rebut the *prima facie* case.

In this case, the *prima facie* case of obviousness is legally deficient since (1) the disclosed prior art range is so universally broad that the range is not sufficient to establish a *prima facie* case under the relevant case law, and (2) the Office can articulate no reason why the ordinarily skilled person would have, based on the disclosures of the combined references, attempted to modify the methods therein to deposit a copper-rich bronze.

First of all, the Office's basis for *prima facie* obviousness that Dietterle et al.'s disclosure of a broad copper range from 0.1 to 99.9 wt-% render applicants' required range of greater than 60% is a deficient basis under the standards set forth in the holdings of *In re Peterson* and *In re Harris*. The holdings of these cases are set forth in MPEP §2144.05 Part I.:

"[A] prior art reference that discloses a range encompassing a **somewhat narrower** claimed range is sufficient to establish a prima facie case of obviousness." *In re Peterson*, 315 F.3d 1325, 1330, 65 USPQ2d 1379, 1382-83 (Fed. Cir. 2003). See also *In re Harris*, 409 F.3d 1339, 74 USPQ2d 1951 (Fed. Cir. 2005) (claimed alloy held obvious over prior art alloy that taught ranges of weight percentages overlapping, and in most instances completely encompassing, claimed ranges; furthermore, narrower ranges taught by reference overlapped all but one range in claimed invention). However, **if the reference's disclosed range is so broad as to encompass a very large number of possible distinct compositions**, this might present a situation analogous to the **obviousness of a species when the prior art broadly discloses a genus**. *Id.* See also *In re Baird*, 16 F.3d 380, 29 USPQ2d 1550 (Fed. Cir. 1994); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). See MPEP §2144.08

In this case, Dietterle et al.'s broader disclosure from 0.1 to 99.9 wt-% encompasses the entire universe of copper concentrations that may be present in an alloy considered a tin-copper alloy. In other words, if the copper concentration were at or lower than 0.1%, the tin-copper alloy is effectively a pure tin deposit having less than a trace of copper, which is likely not enough to materially affect the properties of the tin. Likewise, if the copper concentration were greater than 99.9%, the tin-copper alloy is effectively a pure copper deposit having less than a trace of tin, which is likely not enough to materially affect the properties of the copper. Inasmuch as the disclosed prior art range encompasses the entire universe of

copper alloys, according to *Harris*, "...this might present a situation analogous to the ***obviousness of a species when the prior art broadly discloses a genus...***" Therefore, the standards set forth in MPEP §2144.08 apply. MPEP §2144.08 includes a flow chart that allows the Office to tailor the analysis toward a determination of whether *Dietterle et al.*'s universally broad range would have rendered applicants' narrower range.

The analysis therein requires the Office to consider whether *Dietterle et al.*'s disclosure of a universe-wide copper content would have provided a reason to select a copper content greater than 60%. The questions to consider in order:

II.A.4.a. Is genus so small that each member is inherently disclosed?

II.A.4.b. Are there express teachings that would have motivated the selection?

II.A.4.c. Is there a teaching of structure similarity?

II.A.4.f. Is there any other teaching to support the selection of the species or subgenus?

Applicants submit that the answers to these questions are clearly No. In response to II.A.4.a., the genus from 0.1 to 99.9 wt-% encompasses (more than) the entire universe of copper concentrations that may be present in an alloy considered a tin-copper alloy. Since it encompasses every possible alloy, it cannot fairly be deemed to be "so small that each member is inherently disclosed," such as applicants' copper content of greater than 60%. In response to II.A.4.b., neither *Dietterle et al.* nor *Tsuji et al.* contain any express teachings that would have led the ordinarily skilled person to a deposit of a bronze having greater than 60% copper, either openly or latently. Both references state throughout their disclosure that their methods

are useful for plating tin-rich solders, which have low copper contents, such as below 10%, or even less, such as below 5%. There are no teachings that would have suggested the ordinarily skilled person attempt to deposit solders having greater copper contents. In response to II.A.4.c., in this case the answer is No, because the references do not disclose that tin-rich solder alloys are structurally, mechanically, chemically, or otherwise similar to copper-rich bronzes. Finally, in response to II.A.4.f., there are no teachings in either reference towards the selection of applicants' greater than 60% copper content. Using this analysis, the MPEP leads to the conclusion that the copper content range is not obvious under §103. Accordingly, applicants request withdrawal of the rejection.

Moreover, the Office has articulated no reason as to why one skilled in the art would modify the specific teachings of Dietterle et al. and Tsuji et al. to formulate high Cu alloys. As recently emphasized by the Supreme Court in *KSR v. Teleflex*:

...a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. Although common sense directs one to look with care at a patent application that claims as innovation the combination of two known devices according to their established functions, ***it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.*** This is because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known. (Emphasis added.) *KSR*, 82 USPQ2d at 1396.

Often, it will be necessary ... to look to interrelated teachings of multiple patents; the effects of demands known to the design community or

present in the marketplace; and the background knowledge possessed by a person having ordinary skill, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. To facilitate this review, this analysis should be made explicit. KSR, 82 USPQ2d at 1396.

In the present situation, no **reason** to adapt the respective teachings of the cited references to high Cu alloys can fairly be advanced. The Office merely states (page 11) that it would have been obvious because the ratio is "a result-effective variable and one skilled in the art has the skill to calculate the ratio" But here no reason or purpose has been advanced to manipulate this result-effective variable -- neither applicants' purpose or any other purpose -- except the broad defensive suggestion that Dietterle's alloys "can contain" 0.1 to 99.9% Cu. But why would one attempt to use > 60% Cu? Because one can? -- no reason is given.

Simply stated, the Office has failed to establish a *prima facie* case of obviousness based on the combination of the Dietterle et al. and Tsuji et al. references since the cited range relied on is so universally broad that it provides no basis for concluding that applicants' copper range is obvious and since no reason may be articulated to modify the methods of the prior art to deposit a copper-rich bronze.

Even if the references could fairly be deemed to establish a *prima facie* case of obviousness (which they do not), according to MPEP §2144.05 Part III.: "A *prima facie* case of obviousness may [also] be rebutted by showing that the art, **in any material respect**, teaches away from the claimed invention. *In re Geisler*, 116 F.3d 1465, 1471, 43 USPQ2d 1362, 1366 (Fed. Cir. 1997)..."

Here, Dietterle is unequivocally directed to solder alloys and only solder alloys; and from their working examples and

express statements it is evident the reference is dealing only with low Cu bronzes:

To allow the alloys to be soldered at low temperatures, they preferably comprise a copper content of 0.5 to 10 wt%, particularly preferred 2 to 5 wt-%. Dietterle, paragraph [0061].

This table shows the tin ion concentration, copper ion concentration, and ratio of tin ion to copper ion concentrations in Dietterle et al.'s Examples:

Example	Tin ion concentration (g/L)	Copper ion concentration (g/L)	Ratio of tin ion to copper ion
1, 3	20	0.5	40
2	40	1	40
4	38.5	1	38.5
5	36.8	1	36.8

See also Tsuji et al.'s examples, which disclose similar ratios of tin ion to copper ion:

Example	Tin ion concentration (g/L)	Copper ion concentration (g/L)	Ratio of tin ion to copper ion
1A, 2A, 3A, 7A, 8A, 9A, 10A, 11A, 12A	23.43	0.17	138
4A, 5A, 6A	23.74	0.32	74
13A, 15A, 16A	9.5	0.11	86
14A	19.59	0.44	45
17A	9.5	0.22	43
18A	59.36	1.14	52

These examples, in combination with additional disclosure elsewhere in both the Dietterle et al. and Tsuji et al. references, materially teach away methods for the deposition of copper rich bronzes. Applicants note, as the Office has urged in related application 11/105,947, that MPEP 2123(II) states,

"Disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or non-preferred embodiments." But this quote does not apply to the present set of facts. In particular, the MPEP presents that statement as the holding in, or at least a teaching of, the case *In re Susi*, 169 USPQ 423. In the *Susi* case, the prior art Knapp reference disclosed a "particularly preferred embodiment" and "a most particularly preferred embodiment." See *Susi* at page 426. The Court's statement that preferred embodiments do not teach away was in response to the applicant's argument that presentation of a "most particularly preferred embodiment" teaches away from the embodiments presented simply as "particularly preferred." In contrast, in the *Dietterle et al.* and *Tsuji et al.* references there are no embodiments whatsoever - particularly preferred, simply preferred, or not preferred - with high Cu. All the embodiments specified are low Cu. If this does not constitute "teaching away" from high Cu, the "teaching away" concept is wholly devoid of any meaning.

Accordingly, applicants respectfully submit that claim 30 and its dependent claims are patentable over the cited combinations for the reason that they require high Cu. The subject matter is therefore not obvious; and even if it could fairly be deemed *prima facie* obvious, there is sufficient teaching away to overcome *prima facie* obviousness under the principles stated in the MPEP and controlling case law.

Claims 31-34, 36-38, and 56-60 depend from claim 30 and are therefore patentable for the same reasons as claim 30 and by virtue of the additional requirements therein.

B. Electrolyte Claims 40-50 and 61

Reconsideration is requested of the rejection of claims 40-50 and 61 as being obvious over Dietterle et al. (WO02/24979 and U.S. 7,179,362) in view of Tsuji et al. (U.S. 6,607,653).

Claim 40 is directed to an aqueous acidic electrolyte comprising:

- a) tin ions;
- b) copper ions;
- c) an alkylsulfonic acid;
- d) an aromatic, nonionic wetting agent; and
- e) an oxidation inhibitor;

wherein the aqueous acidic electrolyte has a pH less than about 1 and a ratio of tin ion concentration to copper ion concentration is sufficient to deposit a bronze having a tin/copper ratio of about 40/60, about 20/80, or about 10/90.

Claim 40 and its dependent claims are patentable for the reasons stated in Part III.A. of this amendment. Briefly, the cited references do not disclose electrolytes useful for the deposition of high copper bronzes, and in fact teach away from their disclosure in that Dietterle et al. and Tsuji et al. disclose tin/copper ratios that are much higher than those required by claim 40.

C. Electrolyte Claims 51

Reconsideration is requested of the rejection of claim 51 as being obvious over Dietterle et al. (WO02/24979 and U.S. 7,179,362) in view of Tsuji et al. (U.S. 6,607,653) and further in view of EP 1,001,054.

Claim 51 depends from claim 40 and is patentable for the same reasons as claim 40 and by virtue of the additional requirements therein.

D. Electrolyte Claims 53-55 and 62

Reconsideration is requested of the rejection of claims 53-55 and 62 as being obvious over Dietterle et al. (WO02/24979 and U.S. 7,179,362) in view of Tsuji et al. (U.S. 6,607,653).

Claim 53, like claim 40, is directed to an aqueous acid electrolyte comprising, among other components: (1) a pH less than 1, (2) an aromatic, nonionic wetting agent, (3) an oxidation inhibitor, and (4) a ratio of tin ion concentration to copper ion concentration sufficient to deposit a bronze having a tin/copper ratio of about 40/60, about 20/80, or about 10/90. Accordingly, claim 53 and claims 54-55 which depend therefrom are submitted to be patentable for the same reasons as claim 40 and by virtue of the additional requirements therein.

IV. New Claims

Claims 63, 68, and 73 depend from claims 30, 40, and 53, but differ in that they require the electrolytes to consist essentially of the listed ingredients. As stated in MPEP §2111.03:

The transitional phrase "consisting essentially of" limits the scope of a claim to the specified materials or steps "and those that do not materially affect the basic and novel characteristic(s)" of the claimed invention. *In re Herz*, 537 F.2d 549, 551-52, 190 USPQ 461, 463 (CCPA 1976) (emphasis in original)

As further explained below, Dietterle et al. and Tsuji et al. disclose that their organic sulfur-containing compounds are essential to the efficacy of deposition from their Sn-Cu baths. Since claims 63, 68, and 73 exclude such organic sulfur-containing compounds, these claims are patentable over the cited references. Moreover, there is no suggestion in these references to one of skill in the art as to how to successfully deposit from these baths in the absence of the organic sulfur-

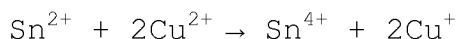
containing compounds, in view of the problems and solutions disclosed by the authors of both references.

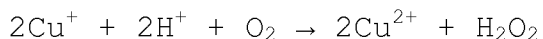
It is conventionally known to deposit tin or tin-based alloys having high tin content from acidic electrolytes. The prior art recognizes that certain difficulties arise in the deposition of tin alloys further comprising copper from an acidic electrolyte comprising copper ions in any amount. As stated in applicants' specification at paragraph [0005]:

[0005] However, such methods have their limits in the deposition of tin-copper alloys with high copper contents, such as the so-called "true" bronzes, which have a copper content of at least 10%. For example, due to the high difference of potential between tin and copper **higher rates of oxidation of the divalent tin can occur, due to which it very easily becomes oxidized to tetravalent tin in acid electrolytes.** However, in **this form tin can no longer be electrolytically deposited in an acid** and thus is withdrawn from the process, which leads to uneven deposition of the two metals and to a decrease of the deposition rate. In addition, **oxidation to tetravalent tin leads to increased sludge formation**, which can prevent stable operation and long lifetime of the acid electrolyte. Moreover, because of such contaminated of a firmly bonding and pore-free coating is no longer guaranteed.

The references cited by the Office in establishing its *prima facie* case of obviousness also recognized problems that arise when a composition comprises both tin and copper ions. See for example, Dietterle et al. at Col. 2, lines 42-63:

The oxidation of tin (II) is catalytically accelerated by means of copper ions. The divalent tin can reduce copper into monovalent copper. The monovalent copper is reoxidised to the divalent form again by means of atmospheric oxygen. Hydrogen peroxide is thereby formed as an intermediate product. The following reaction equations show the cited reaction:





This reaction mechanism is described by W. M. Murray and N. H. Furman (J. Am. Chem. Soc. 58 (1936) 1843).

Copper concentrations of up to 5 g/L, depending on the tin content of the electrolyte, are required for depositing tin-copper alloys having a copper proportion of up to 10 wt.-%. **These high concentrations of copper cause such high oxidation rates of the divalent tin that there is no stable operation of the acid electrolyte.** Oxidation of the tin (II) **cannot be prevented** in the presence of copper even by adding higher amounts of the antioxidants known from the prior art.

Tsuji et al. disclosed additional problems at Col. 1, line 31-Col. 2, line 6:

Generally, electroplating with the alloy containing tin and copper is conducted while supplying tin(II) ions in the bath using a tin anode. However, since the copper salts contained in the bath have a standard electrode potential higher than the tin of the anode, chemical substitution occurs between the copper and tin. **This may lead to the deposit of metallic copper on the anode. If the copper is deposited on the anode, the copper salt concentration in the bath is lowered and the bath composition changes.** Therefore, the resulting plated coating of the tin-copper alloy tends to have inconstant composition. Particularly in the plating bath of the tin-copper alloy, the copper salt concentration in the bath is usually lower than the tin(II) salt concentration, and thus the change in the copper salt concentration greatly affect the composition of the coating.

...

Further, the plating bath containing tin and copper is likely to become turbid because of its unstability, unlike a tin plating bath, tin-lead alloy plating bath or the like. For example, the plating bath starts to become slightly turbid about one week after preparation, and the entire plating bath becomes turbid 1 month after the preparation.

The bath becomes turbid because divalent tin salt in the bath is oxidized to be tetravalent, thereby producing colloidal particles of tin oxide hydrate. Even the addition of an antioxidant can not completely prevent the bath from becoming turbid. Therefore, the Sn^{2+} content in the bath may be considerably lowered, which greatly inhibits obtaining a plated coating of an alloy containing tin and copper which has constant composition.

In view of these disclosures of the cited references, the prior art at the time of applicants' invention recognized that deposition of tin-copper alloys from electrolytes having any copper ion content was beset by problems related to (1) anode passivation due to deposition of copper on the tin anode, and (2) oxidation of tin(II) ions to tin(IV) ions due to a redox reaction with copper ions. Both cited references state that these problems could not be solved even by adding anti-oxidants. See Dietterle et al. at Col. 2, lines 60-63 and Tsuji et al. at Col. 2, lines 1-3. In view of these problems, electrolytic deposition of tin-copper alloys in acidic solution simply was not practicable.

Dietterle et al. and Tsuji et al. disclose nearly identical solutions to problems related to the deposition of tin-copper alloys having high tin content from acidic solution. In both references, the solution mandates the inclusion of an organic sulfur-containing compound, such as dithioglycols, thioethers, crown thioethers, and the like, as an **essential feature** of their acid electrolytic compositions. The included organic sulfur-containing compound is stated to inhibit or prevent both (1) copper passivation of the tin anode and (2) oxidation of tin(II) ions to tin (IV) ions.

Dietterle mandate the inclusion of an organic sulfur-containing compound at Col. 3, lines 21 et seq.:

To successfully deposit tin-copper alloys having a specific copper content from an acid electrolyte containing divalent tin ions, **it is thus necessary** to find suitable compounds which cause a complexing of the copper, thereby shifting the standard potential of the copper to more negative values so that the desired concentration of copper ions in the electrolyte can be maintained. Furthermore, the complexing agents must act selectively on copper. If a complexing of tin takes place at the same time, a shift in the standard potential thereof to more negative values would also occur here. The original potential difference of the non-complexed ions would thus be restored.

The object is solved by means of an acid, aqueous electrolyte for depositing tin-copper alloys, **comprising** one or more alkylsulfonic acids or alkanolsulfonic acids, one or more soluble tin (II) salts, one or more soluble copper (II) salts, and **one or more organic sulfur compounds...**

Tsuji et al. mandate the inclusion of a sulfur-containing compound at Col. 9, lines 63-65:

The alloy plating bath containing tin and copper of the present invention **essentially contains a specific sulfur-containing compound as an additive.**

Accordingly, both Dietterle et al. and Tsuji et al. mandate the inclusion of an organic sulfur-containing compound, i.e., one of various substituted and unsubstituted dithioglycols, thioethers, and crown thioethers and the like, as an essential component of the compositions used in their methods. Not surprisingly, each and every disclosed example of embodiments of the inventions in both references includes such an additive.

Since claims 63, 68, and 73 exclude such components by virtue of the transition "consisting essentially of", these claims are patentable over the cited references which disclose plating baths comprising organic sulfur-containing compounds as essential components.

New claims 64-67, 69-72, and 74 depend from claims 30, 40, and 53, respectively. Each of these new claims are directed to a method or an electrolyte that comprises the ingredients listed in the claim, but in view of the use of the "consisting of" transitional phrase, these claims "exclude[s] any element, step, or ingredient not specified in the claim. *In re Gray*, 53 F.2d 520, 11 USPQ 255 (CCPA 1931)..." See MPEP §2111.03. Since these claims exclude ingredients not listed in the claims, these claims are patentable over the cited references since the references require an organic sulfur compound as an essential ingredient.

CONCLUSION

In view of the foregoing, applicants respectfully request reconsideration and allowance of the pending claims.

Respectfully submitted,

/paul fleischut/

Paul I. J. Fleischut, Reg. No. 35,513
SENNIGER POWERS
One Metropolitan Square, 16th Floor
St. Louis, Missouri 63102
(314) 231-5400

PIF/NAK/axj